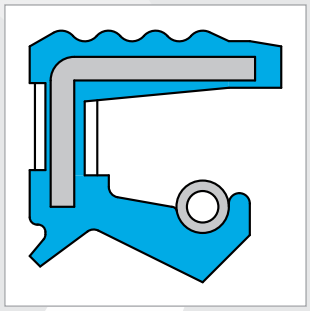


STANDARD SHAFT SEALS
TCW

DESCRIPTION

The TCW profile is a shaft seal composed of a single metal cage with rubber grooves on the outside of the cage, a primary sealing lip with integrated spring and an additional anti-pollution lip.

ADVANTAGES

Very good static sealing

Very good thermal expansion compensation

Greater roughness is allowed in the housing

Reduced risk of corrosion

Easy to assemble with very limited bounce-back effect

Sealing for low and high viscosity fluids

Modern primary sealing lip with low radial forces

Protection against undesirable air contaminants

APPLICATIONS

Shaft sealing
Engines
Pumps
Transmissions

MATERIALS

Rubber
ACM 70 - 75 Shore A
EPDM 70 - 75 Shore A
FKM 70 - 75 Shore A
HNBR 70 - 75 Shore A
NBR 70 - 75 Shore A
Metal cage
Steel - AISI 1010
Spring
Steel - AISI 1070 - 1090
Stainless steel - AISI 316

SEAL DESIGN

Tolerance for the outside diameter of the seal (ØD)

Bore diameter ØD1 (mm)	Apparent metal cage	Rubber coating	Coating with grooves
ØD1 ≤ 50.0	+0.10 / +0.20	+0.15 / +0.30	+0.20 / +0.40
50.0 < ØD1 ≤ 80.0	+0.13 / +0.23	+0.20 / +0.35	+0.25 / +0.45
80.0 < ØD1 ≤ 120.0	+0.15 / +0.25	+0.20 / +0.35	+0.25 / +0.45
120.0 < ØD1 ≤ 180.0	+0.18 / +0.28	+0.25 / +0.45	+0.30 / +0.55
180.0 < ØD1 ≤ 300.0	+0.20 / +0.30	+0.25 / +0.45	+0.30 / +0.55
300.0 < ØD1 ≤ 500.0	+0.23 / +0.35	+0.30 / +0.55	+0.35 / +0.65
500.0 < ØD1 ≤ 630.0	+0.23 / +0.35	+0.35 / +0.65	+0.40 / +0.75

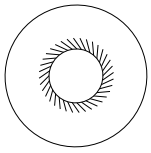
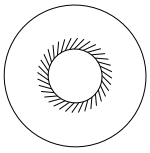
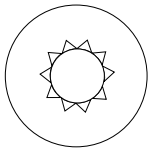
Roundness tolerance

Bore diameter ØD1 (mm)	Apparent metal cage	Rubber coating
ØD1 ≤ 50.0	0.18	0.25
50.0 < ØD1 ≤ 80.0	0.25	0.35
80.0 < ØD1 ≤ 120.0	0.30	0.50
120.0 < ØD1 ≤ 180.0	0.40	0.65
180.0 < ØD1 ≤ 300.0	0.25% of the outside diameter	0.80
300.0 < ØD1 ≤ 500.0	0.25% of the outside diameter	1.00
500.0 < ØD1 ≤ 630.0	-	-

Tolerance for the inside diameter of the seal (Ød)

Free and without constraint, the inside diameter of the sealing lip is always smaller than the diameter of the shaft. The pre-tightening or interference denotes the difference between these two values. Depending on the shaft diameter, the diameter of the sealing lip is generally considered to be less, between 0.8 and 3.5 mm.

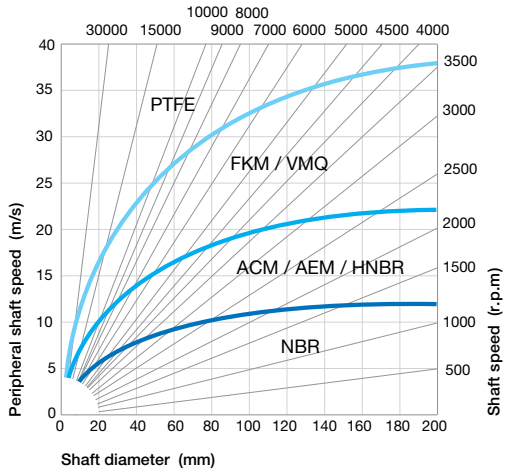
Pumping leads

Clockwise	Anti-clockwise	Bi-directional
		
R	L	H0

Other types of pumping leads can be created according to your specifications. Please contact our experts.

TECHNICAL DATA

Speed



The shaft seals with an additional protective lip are limited to a speed of 8 m/sec.

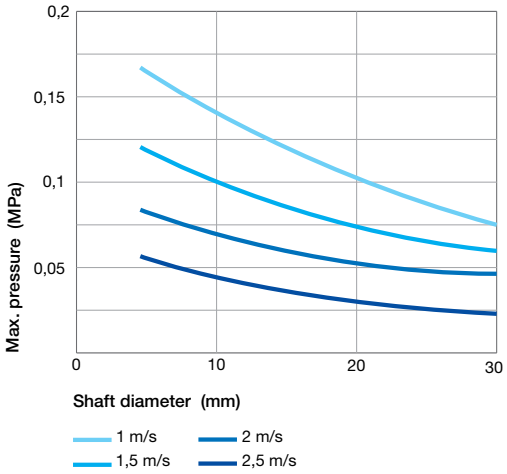
Linear speed calculation:

$$s\ (m/s) = \frac{[\text{shaft } Ø\ (mm)\ \times\ \text{speed (rpm)}\ \times\ \pi]}{60{,}000}$$

Pressure

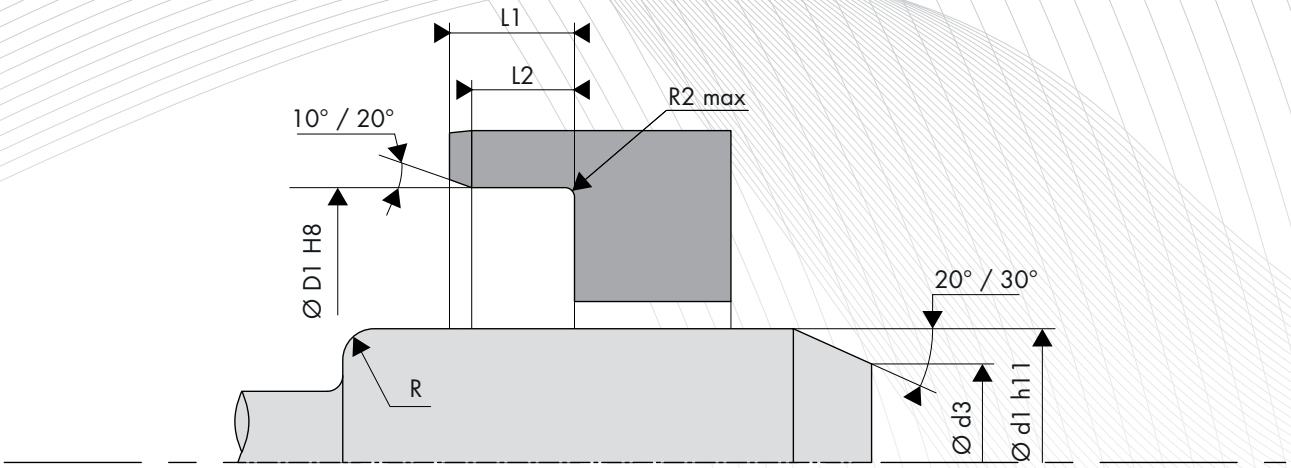
The standard shaft seals are generally used in unpressurised environments, or for pressures between 0.02 and 0.05 MPa maximum.

Higher pressures are acceptable, following testing, for standard NBR or FKM shaft seals used on a shaft of less than 30 mm.



Temperature / Media

Media		Maximum temperature depending on the materials						
		ACM	AEM	EPDM	FKM	HNBR	NBR	VMQ
Mineral oils	Oils for motors	+130°C	+130°C	–	+170°C	+130°C	+100°C	+150°C
	Oils for gearboxes	+120°C	+130°C	–	+150°C	+110°C	+80°C	+130°C
	Oils for hypoid gears	+120°C	+130°C	–	+150°C	+110°C	+80°C	–
	ATF oils	+120°C	+130°C	–	+170°C	+130°C	+100°C	–
	Hydraulic oils	+120°C	+130°C	–	+150°C	+130°C	+90°C	–
	Greases	–	+130°C	–	–	+100°C	+90°C	–
Fire-resistant fluids	HFA group - Emulsion with more than 80% water	–	–	–	–	+70°C	+70°C	+60°C
	HFB group - Opposite solution (water in oil)	–	–	–	–	+70°C	+70°C	+60°C
	HFC group - Polymer aqueous solution	–	–	+60°C	–	+70°C	+70°C	–
	HFD group - Water-free synthetic fluids	–	–	–	+150°C	–	–	–
Other fluids	EL + L heating oil	–	–	–	–	+100°C	+90°C	–
	Air	+150°C	+150°C	+150°C	+200°C	+130°C	+100°C	+200°C
	Water	–	–	+150°C	+100°C	+100°C	+90°C	–
	Water for washing	–	–	+130°C	+100°C	+100°C	+90°C	–
Temperature range	Min.	-25°C	-40°C	-45°C	-20°C	-30°C	-30°C	-60°C
	Max.	+150°C	+150°C	+150°C	+200°C	+150°C	+100°C	+200°C



SHAFT DESIGN

Shaft hardness

Rotation speed	Hardness in HRC
s ≤ 4.0 m/sec	45 HRC
4.0 < s ≤ 10.0 m/s	55 HRC
s > 10.0 m/sec	60 HRC

Surface roughness

Ra *	0.2 to 0.8 µm
Rz	1.0 to 4.0 µm
Rmax	≤6.3 µm

*Ra = 0.1 µm for demanding applications

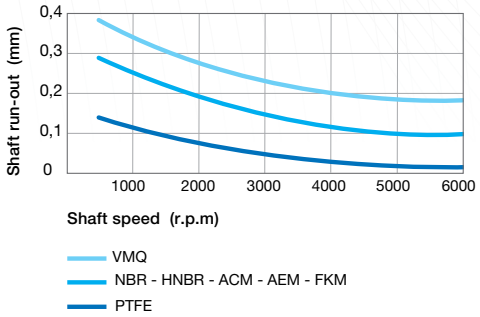
Shaft tolerance

Shaft diameter Ød1 (mm)	Tolerance h11 (mm)
Ød1 ≤ 3.0	-0.060 / 0
3.0 < Ød1 ≤ 6.0	-0.075 / 0
6.0 < Ød1 ≤ 10.0	-0.090 / 0
10.0 < Ød1 ≤ 18.0	-0.110 / 0
18.0 < Ød1 ≤ 30.0	-0.130 / 0
30.0 < Ød1 ≤ 50.0	-0.160 / 0
50.0 < Ød1 ≤ 80.0	-0.190 / 0
80.0 < Ød1 ≤ 120.0	-0.220 / 0
120.0 < Ød1 ≤ 180.0	-0.250 / 0
180.0 < Ød1 ≤ 250.0	-0.290 / 0
250.0 < Ød1 ≤ 315.0	-0.320 / 0
315.0 < Ød1 ≤ 400.0	-0.360 / 0
400.0 < Ød1 ≤ 500.0	-0.400 / 0

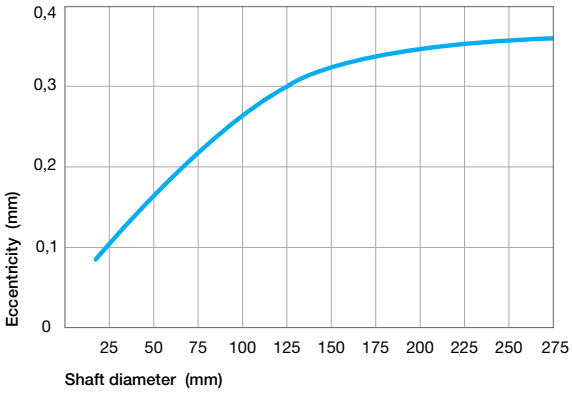
Chamfer and radius

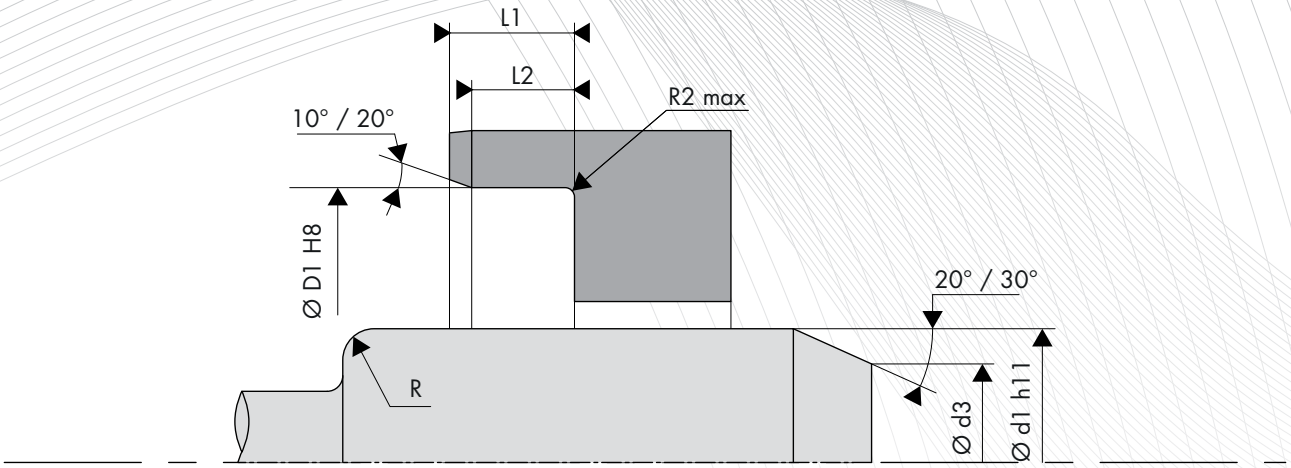
Shaft diameter Ød1 (mm)	Chamfer diameter Ød3 (mm)	Radius R (mm)
Ød1 ≤ 10.0	Ød1 - 1.50	2.00
10.0 < Ød1 ≤ 20.0	Ød1 - 2.00	2.00
20.0 < Ød1 ≤ 30.0	Ød1 - 2.50	3.00
30.0 < Ød1 ≤ 40.0	Ød1 - 3.00	3.00
40.0 < Ød1 ≤ 50.0	Ød1 - 3.50	4.00
50.0 < Ød1 ≤ 70.0	Ød1 - 4.00	4.00
70.0 < Ød1 ≤ 95.0	Ød1 - 4.50	5.00
95.0 < Ød1 ≤ 130.0	Ød1 - 5.50	6.00
130.0 < Ød1 ≤ 240.0	Ød1 - 7.00	8.00
240.0 < Ød1 ≤ 500.0	Ød1 - 11.00	12.00

Shaft run out



Eccentricity





HOUSING DESIGN

Surface roughness

Ra	1.6 to 6.3 µm
Rz	10.0 to 25.0 µm
Rmax	≤25.0 µm

Housing tolerance

Bore diameter ØD1 (mm)	Tolerance H8 (mm)
3.0 < ØD1 ≤ 6.0	0 / +0.018
6.0 < ØD1 ≤ 10.0	0 / +0.022
10.0 < ØD1 ≤ 18.0	0 / +0.027
18.0 < ØD1 ≤ 30.0	0 / +0.033
30.0 < ØD1 ≤ 50.0	0 / +0.039
50.0 < ØD1 ≤ 80.0	0 / +0.046
80.0 < ØD1 ≤ 120.0	0 / +0.054
120.0 < ØD1 ≤ 180.0	0 / +0.063
180.0 < ØD1 ≤ 250.0	0 / +0.072
250.0 < ØD1 ≤ 315.0	0 / +0.081
315.0 < ØD1 ≤ 400.0	0 / +0.089
400.0 < ØD1 ≤ 500.0	0 / +0.097
500.0 < ØD1 ≤ 630.0	0 / +0.110

Housing radius and width

Height H1 (mm)	Width		Radius R2 max (mm)
	L2min (H1 x 0.85)	L1min (H1 x +0.3)	
7.00	5.95	7.30	0.50
8.00	6.80	8.30	
10.00	8.50	10.30	
12.00	10.30	12.30	0.70
15.00	12.75	15.30	
20.00	17.00	20.30	

DIMENSIONS

Part number	Shaft diameter Ød1 h11	Bore diameter ØD1 H8	Seal height H1
TCW 8 x 16 x 5	8.00	16.00	5.00
TCW 17 x 27 x 6	17.00	27.00	6.00
TCW 19 x 32 x 7	19.00	32.00	7.00
TCW 20 x 32 x 5.5	20.00	32.00	5.50
TCW 20 x 32 x 6	20.00	32.00	6.00
TCW 20 x 32 x 7	20.00	32.00	7.00
TCW 20 x 35 x 5.5	20.00	35.00	5.50
TCW 20 x 52 x 7.5	20.00	52.00	7.50
TCW 22 x 40 x 8	22.00	40.00	8.00
TCW 25 x 35 x 7	25.00	35.00	7.00
TCW 25 x 40 x 7	25.00	40.00	7.00
TCW 25 x 45 x 8	25.00	45.00	8.00
TCW 25 x 47 x 7	25.00	47.00	7.00
TCW 25 x 47 x 10	25.00	47.00	10.00
TCW 26 x 42 x 8	26.00	42.00	8.00
TCW 27 x 37 x 7	27.00	37.00	7.00
TCW 27 x 43 x 8	27.00	43.00	8.00
TCW 27 x 47 x 7	27.00	47.00	7.00
TCW 28 x 38 x 6	28.00	38.00	6.00
TCW 28 x 38 x 7	28.00	38.00	7.00
TCW 28 x 42 x 5	28.00	42.00	5.00
TCW 28 x 42 x 7	28.00	42.00	7.00
TCW 28 x 44 x 6	28.00	44.00	6.00
TCW 28 x 56 x 7	28.00	56.00	7.00
TCW 28 x 70 x 10	28.00	70.00	10.00
TCW 30 x 40 x 7	30.00	40.00	7.00
TCW 30 x 42 x 6	30.00	42.00	6.00
TCW 30 x 42 x 7	30.00	42.00	7.00
TCW 30 x 45 x 5	30.00	45.00	5.00
TCW 30 x 52 x 7	30.00	52.00	7.00
TCW 30 x 55 x 10	30.00	55.00	10.00
TCW 30 x 72 x 8	30.00	72.00	8.00
TCW 32 x 42 x 7	32.00	42.00	7.00
TCW 32 x 46 x 6	32.00	46.00	6.00
TCW 32 x 47 x 8	32.00	47.00	8.00
TCW 32 x 47 x 10	32.00	47.00	10.00
TCW 34 x 47 x 7	34.00	47.00	7.00
TCW 34 x 47 x 8	34.00	47.00	8.00
TCW 35 x 47 x 7	35.00	47.00	7.00
TCW 35 x 47 x 8	35.00	47.00	8.00
TCW 35 x 48 x 10	35.00	48.00	10.00
TCW 35 x 50 x 7	35.00	50.00	7.00
TCW 35 x 50 x 10	35.00	50.00	10.00
TCW 35 x 52 x 8	35.00	52.00	8.00
TCW 35 x 55 x 9	35.00	55.00	9.00
TCW 35 x 57 x 9	35.00	57.00	9.00
TCW 35 x 62 x 10	35.00	62.00	10.00
TCW 36 x 50 x 7	36.00	50.00	7.00
TCW 36 x 57 x 10	36.00	57.00	10.00
TCW 36 x 62 x 7	36.00	62.00	7.00
TCW 37 x 57 x 10	37.00	57.00	10.00
TCW 37 x 61 x 10	37.00	61.00	10.00
TCW 38 x 50 x 6	38.00	50.00	6.00
TCW 38 x 52 x 6	38.00	52.00	6.00
TCW 38 x 52 x 7	38.00	52.00	7.00
TCW 38 x 60 x 8	38.00	60.00	8.00
TCW 38 x 62 x 8	38.00	62.00	8.00
TCW 39 x 57 x 9.7	39.00	57.00	9.70
TCW 39 x 72 x 8	39.00	72.00	8.00
TCW 40 x 52 x 7	40.00	52.00	7.00
TCW 40 x 52 x 8	40.00	52.00	8.00
TCW 40 x 54 x 6.8	40.00	54.00	6.80

Part number	Shaft diameter Ød1 h11	Bore diameter ØD1 H8	Seal height H1
TCW 40 x 55 x 7	40.00	55.00	7.00
TCW 40 x 55 x 10	40.00	55.00	10.00
TCW 40 x 56 x 7	40.00	56.00	7.00
TCW 40 x 58 x 10	40.00	58.00	10.00
TCW 40 x 60 x 10	40.00	60.00	10.00
TCW 40 x 76 x 7	40.00	76.00	7.00
TCW 42 x 53 x 7	42.00	53.00	7.00
TCW 42 x 54 x 6	42.00	54.00	6.00
TCW 42 x 55 x 7	42.00	55.00	7.00
TCW 42 x 55 x 9	42.00	55.00	9.00
TCW 42 x 56 x 7	42.00	56.00	7.00
TCW 42 x 62 x 7	42.00	62.00	7.00
TCW 42 x 66 x 6	42.00	66.00	6.00
TCW 42 x 66 x 8	42.00	66.00	8.00
TCW 44 x 72 x 8	44.00	72.00	8.00
TCW 45 x 60 x 9	45.00	60.00	9.00
TCW 45 x 62 x 7	45.00	62.00	7.00
TCW 45 x 62 x 8	45.00	62.00	8.00
TCW 45 x 62 x 10	45.00	62.00	10.00
TCW 45 x 65 x 7	45.00	65.00	7.00
TCW 45 x 67 x 8	45.00	67.00	8.00
TCW 46 x 58 x 7	46.00	58.00	7.00
TCW 48 x 68 x 8	48.00	68.00	8.00
TCW 48 x 72 x 8	48.00	72.00	8.00
TCW 49 x 60 x 7	49.00	60.00	7.00
TCW 50 x 65 x 8	50.00	65.00	8.00
TCW 50 x 68 x 10	50.00	68.00	10.00
TCW 51 x 65 x 7	51.00	65.00	7.00
TCW 52 x 68 x 8	52.00	68.00	8.00
TCW 52 x 68 x 10	52.00	68.00	10.00
TCW 55 x 80 x 10	55.00	80.00	10.00
TCW 55 x 90 x 10	55.00	90.00	10.00
TCW 57 x 73 x 8	57.00	73.00	8.00
TCW 58 x 72 x 8	58.00	72.00	8.00
TCW 58 x 80 x 8	58.00	80.00	8.00
TCW 60 x 80 x 7.5	60.00	80.00	7.50
TCW 60 x 80 x 10	60.00	80.00	10.00
TCW 62 x 80 x 12	62.00	80.00	12.00
TCW 65 x 85 x 10	65.00	85.00	10.00
TCW 65 x 90 x 10	65.00	90.00	10.00
TCW 70 x 87 x 8.5	70.00	87.00	8.50
TCW 70 x 88 x 8	70.00	88.00	8.00
TCW 70 x 90 x 10	70.00	90.00	10.00
TCW 70 x 100 x 10	70.00	100.00	10.00
TCW 70 x 120 x 10	70.00	120.00	10.00
TCW 72 x 92 x 9.5	72.00	92.00	9.50
TCW 74 x 88 x 8	74.00	88.00	8.00
TCW 75 x 90 x 8	75.00	90.00	8.00
TCW 75 x 95 x 8	75.00	95.00	8.00
TCW 75 x 95 x 12	75.00	95.00	12.00
TCW 75 x 107 x 8	75.00	107.00	8.00
TCW 76 x 92 x 9.5	76.00	92.00	9.50
TCW 76 x 108 x 8.5	76.00	108.00	8.50
TCW 78 x 110 x 8.5	78.00	110.00	8.50
TCW 79 x 97 x 10	79.00	97.00	10.00
TCW 80 x 100 x 8	80.00	100.00	8.00
TCW 80 x 100 x 10	80.00	100.00	10.00
TCW 80 x 100 x 12	80.00	100.00	12.00
TCW 80 x 110 x 12	80.00	110.00	12.00
TCW 85 x 100 x 9	85.00	100.00	9.00
TCW 85 x 105 x 9	85.00	105.00	9.00
TCW 85 x 105 x 11	85.00	105.00	11.00

Part number	Shaft diameter Ød1 h11	Bore diameter ØD1 H8	Seal height H1
TCW 85 x 105 x 12	85.00	105.00	12.00
TCW 85 x 110 x 10	85.00	110.00	10.00
TCW 85 x 117 x 8	85.00	117.00	8.00
TCW 85 x 119 x 8	85.00	119.00	8.00
TCW 85 x 119 x 8.5	85.00	119.00	8.50
TCW 88 x 104 x 8.5	88.00	104.00	8.50
TCW 88 x 108 x 11	88.00	108.00	11.00
TCW 90 x 104 x 11	90.00	104.00	11.00
TCW 90 x 110 x 7	90.00	110.00	7.00
TCW 90 x 110 x 8	90.00	110.00	8.00
TCW 90 x 110 x 11	90.00	110.00	11.00
TCW 90 x 110 x 12	90.00	110.00	12.00
TCW 90 x 120 x 11	90.00	120.00	11.00
TCW 92 x 108 x 9.5	92.00	108.00	9.50

Part number	Shaft diameter Ød1 h11	Bore diameter ØD1 H8	Seal height H1
TCW 92 x 110 x 7	92.00	110.00	7.00
TCW 92 x 110 x 9.5	92.00	110.00	9.50
TCW 92 x 125 x 12	92.00	125.00	12.00
TCW 93 x 114 x 13	93.00	114.00	13.00
TCW 95 x 115 x 12	95.00	115.00	12.00
TCW 95 x 120 x 13	95.00	120.00	13.00
TCW 96 x 116 x 9	96.00	116.00	9.00
TCW 100 x 110 x 7	100.00	110.00	7.00
TCW 100 x 130 x 13	100.00	130.00	13.00
TCW 110 x 130 x 13	110.00	130.00	13.00
TCW 115 x 135 x 10	115.00	135.00	10.00
TCW 125 x 143 x 13	125.00	143.00	13.00
TCW 140 x 160 x 10	140.00	160.00	10.00
TCW 150 x 172 x 18	150.00	172.00	18.00

FRANCE JOINT SAS Zone Artisanale Le Mortier - B.P. 50009 - Cugand - 85613 Montaigu Cedex - France
Ph. **+33 (0)2 51 42 13 76** - Fax **+33 (0)2 51 43 61 14 -** Email: contact@francejoint.fr - Website: **www.francejoint.com**

FRANCEJOINT
SEALING SYSTEMS